PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
H 98 PCT		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE 2003/000558	07.04.2003	09.04.2002
International Patent Classification (IPC) or national classification and IPC		
A61B 17/88		
Applicant		
Hansson, Henrik		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 15 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
27.10.2003	11.02.2004
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Form PCT/IPEA/409 (cover sheet) (January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2003/000558

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language english, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
- ☒ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-7 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* 1-5 as amended (together with any statement) under Article 19
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-5 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2003/000558

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-16	YES
	Claims		NO
Inventive step (IS)	Claims	1-16	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-16	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Document cited in the International Search Report:
D1: US 5810820 A

The cited document represents the general state of the art.
The invention defined in claims 1- 16 is not disclosed by this document.
The cited prior art does not give any indication that would lead a person skilled in the art to the claimed device for extraction of pins at fixation means for fixation of bone fragments at bone fractures. Therefore, the claimed invention is not obvious to a person skilled in the art.
Accordingly, the invention defined in claims 1- 16 is novel and is considered to involve an inventive step. The invention is industrially applicable.

Claims:

1. Device for extraction of pins at fixation means for fixation of bone fragments at bone fractures,

wherein the fixation means (2) includes a sleeve (6) and at least one pin (7) provided in said sleeve (6),

wherein the sleeve (6) at a front end portion (9) has at least one opening (10) in a longitudinal side thereof,

wherein a front part (11) of the pin (7) extends, when said pin (7) is located in an operating position, out of the sleeve (6) through the opening (10) and engage bone material of one of the bone fragments (3, 4), and

wherein the extraction device (1) is adapted to pull the pin (7) in a backwards direction relative to the sleeve (6) in order to withdraw the front part (11) of the pin (7) from bone material of one of the bone fragments (3, 4) and into the sleeve (6),

c h a r a c t e r i z e d i n

that the extraction device (1) comprises an inner extraction member (12) which is connectable to the pin (7), an outer extraction member (13) which is connectable to the sleeve (6) and in which the inner extraction member (12) is insertable and an extraction handle (14) which is rotatable relative to the outer and inner extraction members (13, 12) in order to extract the pin (7) in a direction (R) of extraction or withdrawal relative to the outer extraction member (13) and the sleeve (6),

that the outer extraction member (13) is manually holdable in order to prevent that the outer extraction member (13) could rotate when the extraction handle (14) is rotated, and

that the outer and inner extraction members (13, 12) are constructed such that the outer extraction member (13) prevents that the inner extraction member (12) could rotate relative to the outer extraction member (13) when the extraction handle (14) is rotated.

2. Device according to claim 1, c h a r a c t e r i z e d i n

that the outer and inner extraction members (13, 12) are provided with rotary preventing members (32, 29), which could cooperate with each other in order to prevent that the inner extraction member (12) could rotate relative to the outer extraction member (13),

that the rotary preventing members (32) of the outer extraction member (13) are non-circular parts of a through hole (33) in the outer extraction member (13), and

that the rotary preventing members (29) of the inner extraction member (12) are non-circular parts.

3. Device according to claim 2, c h a r a c t e r i z e d i n

that the rotary preventing members (32) of the outer extraction member (13) are provided in a rear end portion (31) of the outer extraction member (13), and

that the rotary preventing members (29) of the inner extraction member (12) are provided on a rear end portion (24) of the inner extraction member (12).

4. Device according to claim 3, c h a r a c t e r i z e d i n that the lengths of the inner and outer extraction members (12, 13) and the location and shape of their rotary preventing members (29, 32) are chosen such that the extraction handle (14) can cooperate with the inner extraction member (12) only in order to draw or pull said inner extraction member (12) backwards in the direction of extraction or withdrawal (R) only when said inner extraction member (12) is inserted into the outer extraction member (13) such that their rotary preventing members (29, 32) cooperate with each other.

5. Device according to any preceding claim, c h a r a c t e r i z e d i n that at least one part (26 and/or 23) limiting the extraction or withdrawal is provided in order to ensure that the extraction handle (14), through the inner extraction member (12), can draw or

pull the pin (7) backwards so far relative to the sleeve (6), but not farther, that a tip (35) of the pin (7) is situated in the opening (10) of the sleeve (6), and can thereby cooperate with a rear edge of the opening (10) such that the pin (7), through said cooperation with the rear edge of the opening (10), can draw or pull the sleeve (6) backwards along with it in the direction of extraction or withdrawal (R) when the sleeve (6) shall be pulled out of the bone fragment (3, 4) by means of the extraction handle (14).

6. Device according to claim 5, characterized in that said extraction limiting part (26 and/or 23) consists of that the extraction handle (14) has outer threads (26) with such length and/or that the inner extraction member (12) has inner threads (23) with such length that the length of screwing together of the outer threads (26) of the extraction handle (14) and the inner threads (23) of the inner extraction member (12) is limited.

7. Device according to any preceding claim, characterized in

that a rear part (18) of the pin (7) has outer threads (17),

that a front end portion (15) of the inner extraction member (12) has a hole with inner threads (16) which mesh with the outer threads (17) of the pin (7), and

that the hole of the inner extraction member (12) has an inlet (22) without threads, said inlet (22) tapering conically in a direction inwards into the hole, and/or

that the rear part (18) of the pin (7) has an outer portion without threads, said outer portion having a conically increasing diameter in a direction towards the outer threads (17) of the rear part (18).

8. Device according to any preceding claim, characterized in that the inner extraction member (12) has a front end portion (15) with such outer

dimensions or size that it can be inserted into a rear end portion (8) of the sleeve (6).

9. Device according to claim 8, characterized in that the front end portion (15) of the inner extraction member (12), which can be inserted into a rear end portion (8) of the sleeve (6), transforms into inner portions (20) of the inner extraction member (12) having larger outer dimensions through an edge (19) which can engage a rear edge (21) of the sleeve (6) when the inner extraction member (12) is operating.

10. Device according to any preceding claim, characterized in

that the inner extraction member (12) is an elongated rod and has a front end portion (15) with a hole which is provided with inner threads (16) which mesh with outer threads (17) on the pin (7),

that the inner extraction member (12) has a rear end portion (24) with a hole with inner threads (23) which fit or mesh with outer threads (26) on the extraction handle (14),

that the outer extraction member (13) is an elongated sleeve which is open in both ends, and

that the inner extraction member (12) fits into the outer extraction member and is axially displaceable in relation thereto.

11. Device according to claim 10, characterized in that the inner extraction member (12) includes lateral holes (36, 37) which extend into the holes with the inner threads (16, 23) such that said holes can be flushed clean through said lateral holes (36, 37).

12. Device according to any preceding claim, characterized in that the outer extraction member (13) has a sideways or laterally directed handle (34) for holding said outer extraction member (13) such that it does not rotate when the pin (7) is drawn or pulled out in the direction of extraction or withdrawal (R).

13. Device according to any preceding claim, c h a r a c t e r i z e d i n that the device consists of only three members, namely an inner extraction member (12), an outer extraction member (13) and an extraction handle (14).

14. Device according to any preceding claim, c h a r a c t e r i z e d i n

that the opening (10) in the sleeve (6) is round or oval or substantially round or oval, and

that the front part (11) of the pin (7) has a rounded side by means of which it can cooperate with front parts of the opening (10), and another side, opposite to said side, which is flat or substantially flat and which can cooperate with rear parts of the opening (10).

15. Device according to any preceding claim, c h a r a c t e r i z e d i n that the sleeve (6) and pin (7) are made of titanium.

16. Device according to any of claims 1-14, c h a r a c t e r i z e d i n that the sleeve (6) and pin (7) are made of stainless steel.